109 MEASUREMENT AND PAYMENT

109.01 Measurement of Quantities

Method of Measurement

Highway construction work is divided into separate pay items. Each pay item represents a unique construction element of the project (i.e., guardrail, culvert pipe, roadway excavation, etc.).

Each pay item has a method of measurement. A *method of measurement* is a procedure used to determine the quantity of work eligible for payment under each pay item. Usually the method of measurement measures the quantity of a key material for each pay item (i.e., cubic meters of structural concrete) or measures the completed work as a unit (i.e., each catch basin or a lump sum structure).

Each pay item has a method of measurement clause or subsection, which can be found in either the Standard Specifications or the Special Provisions. The clause will describe exactly how the item is to be measured for payment. Subsection 109.01 more fully describes the method of measurement for pay items that have an undefined or incomplete description of how to measure the work for payment.

A method of measurement may or may not represent the actual quantities of materials used. For example, structure backfill is measured based on Standard Drawing B-19.40, which shows vertical fill limits adjacent to the structure. In reality, excavations are sloped next to structures so that the volume of structure backfill placed will always exceed the amount measured for payment.

The method of measurement is not always meant to be a true reflection of work accomplished by the Contractor. The method of measurement is meant solely for payment purposes and may have nothing to with physical quantities actually needed to complete the work in accordance with the contract.

Measuring and Documenting Pay Quantities

The accurate measurement of pay quantities is a very important task for the Inspector. Field measurements for pay items are converted directly into dollars for the Contractor. Because there is a direct relationship between what the Inspector measures and what the Department pays out, inaccuracies in measurements lead to underpayments or overpayments to the Contractor.

Rarely does the Department verify measurements made by the Inspector. So it is important for the Inspector to take measurements for payment very seriously and fully document these measurements.

ADOT has a manual to help Inspectors in this area. The manual is titled *Pay Item Documentation for Inspectors*. This is an excellent guide for all Inspectors on how to accurately measure and document pay quantities on ADOT projects.

Scales

Scaleperson

For many pay items involving bulk materials (i.e., aggregate base, asphalt, and mineral admixture), payment to the Contractor is based on the weight of the material. Unlike other methods of measurement, measuring by weight can be a concern for the Department.

When paying for material by weight, ADOT has very little direct control or involvement in the weighing process. The material is weighed for payment on scales either owned or leased by the Contractor or Material Supplier. The material is entirely handled by the Contractor or Material Supplier before it is placed at the project site. Only when the material arrives at the project site does the Department exercise some control over it. As a result, the Department must rely on the accuracy of the Contractor's scales and the honesty of the Contractor's scale operators and trucking staff when this method of measurement is used.

To help ensure the integrity of this process, the Department requires a scaleperson to monitor the weighing of materials for payment. When manually operated platform scales are used, a scale person shall be assigned full-time to monitor weighing. When automatic scales are used (weights are automatically displayed and printed), the monitoring can be done part-time.

Regardless of whether scale monitoring is done on a part- or full-time basis, the scaleperson has several important duties related to the weighing of materials.

- Ensuring the scales are properly certified.
- Ensuring the scales are being operated correctly and within their prescribed limits.
- Verifying the vehicle tare weights are correct if there is doubt about their accuracy (this could include weighing empty trucks on another scale).
- Verifying that the weight being measured is the same as the weight being recorded (more of an issue on manually operated scales).
- Tracking the accumulated amount of material used on a daily basis.
- Ensuring the Contractor's weigh tickets are completed correctly.

The Resident Engineer or Project Supervisor may assign other duties to the scaleperson to keep the person busy full-time. However, it is important that the scaleperson has sufficient time to fully carry out the duties listed above so they can competently oversee the weighing process.

Scale Accuracy and Calibration

Like a tape measure, a scale needs to measure accurately and consistently according to accepted standards. A scale's accuracy directly reflects how accurately ADOT pays the Contractor for work measured by weight.

To measure weight accurately, two things must occur.

1. The scale must be calibrated correctly.

2. The tare weight of the container holding the material must be accurately known.

Even when the scale weighs accurately and the correct tare weights are used, weights still need to be accurately recorded so payment can be made.

Policy on Scales

1. Truck scales must be sealed by the State Inspector of Weights & Measures or a registered service agency (RSA) within a period of 12 months preceding the date of weighing.

2. The original setup of scales and all moves of scales should be licensed and certified by Weights & Measures or an RSA before the scales are to be used.

3. In the event ADOT personnel cannot satisfy themselves as to the proper accuracy of the scales, at any time prior to or during the weighing operations, weighing operations should cease and the State Inspector of Weights & Measures or a registered service person or agency should be called by the Contractor to inspect the scales.

4. ADOT personnel should not repair scales. An adjustment of the balance bar to maintain zero balance of the beam is the only adjustment that should be made by ADOT personnel. All other adjustments or repairs must be performed by a registered service agency.

5. Scale certifications are good for 12 months. No grace period for recertification should be allowed. Commercial scales are required to be recertified by Weights & Measures or an RSA within 45 days prior to expiration of the 12-month period.

6. Responsibility for scale set-up, operation, maintenance, adjustment, and repair lies with the Contractor.

7. The Construction Group and the Department of Weights & Measures maintains a list of current Registered Service Agencies. Please ensure the RSA is currently certified.

Weighing Requirements

1. An acceptable load invoice or ticket should include truck number, time, source, date, type of material, and net pounds or tons. Each invoice should be signed by the ADOT scaleperson and collected by the spread person or Inspector, who in turn should make a notation of station limits of the spread on the invoice (front or back) and initial. At the completion of the shift, the spread person should deliver the invoices to the project office for checking and totaling.

2. In the event loads or portions of loads are rejected, notes explaining the reason should be made on the respective invoice, initialed, and dated by state and Contractor representatives.

3. Each day's totals and accumulated totals should be recorded on ADOT Form 10-7101. Documentation, such as moisture deductions, should be shown on this form. Each weigh sheet will be signed daily by the scaleperson or their deputy.

4. The daily weigh sheet should be attached to the daily invoices and tapes. The invoices, checked tapes, and weigh sheet should be retained at the project office and accompany the final estimate when submitted.

5. Spot checks of weighing operations and tare weights should be made. The frequency of these checks is dependent on the quantity of material being weighed daily, so the frequency of checking should be at the Resident Engineer's discretion.

109.02 Scope of Payment

Even though the Department pays for completed work on a monthly basis and releases the Contractor's retention as the job progresses, this does not mean the work has been accepted. The Department has the right, until final or partial acceptance (see Subsection 105.20), to require defective work to be corrected by the Contractor, even after the Department has paid for that work.

FHWA-47 Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds

If a Federal Aid contract totals $1 million or more, then Resident Engineer shall determine if the Contractor must furnish a record of the materials, supplies, and labor on FHWA-47 in accordance with the following requirements. See blank forms at end of this chapter for a copy of the FHWA47, and the Contractor's instructions for preparing it.

1. On all Federal Aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the Contractor shall:

   A. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds", prior to the commencement of work under this contract.

   B. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

   C. Furnish, upon the completion of the contract, to the SHA resident engineer on From FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime Contractor's option, either a single report covering all contract work or separate reports for the Contractor and for each subcontract shall be submitted.

109.03 Compensation for Altered Quantities

The quantities shown in the bidding schedule are just estimates of the amount of work required to complete the contract. In reality, the actual quantities are going to be different than the estimated ones. Contractors often ask for unit price adjustments when quantities run under the estimated amounts, items are deleted, or when work is added. Regardless of the reason, Resident Engineers should stay within the guidelines of 104.02 when making unit price adjustments.

As a Department, consistency is needed when allowing unit price adjustments. This ensures fairness to all our Contractors, Subcontractors and materials suppliers. Consult with the District Engineer when you feel a unit price adjustment is warranted outside the scope of 109.03, 104.02, or related subsections (see Subsection 104.02 of this manual).

109.04 Adjustments in the Contract Price

General

Supplemental agreements are used to make changes to ADOT construction contracts. They add or delete work to the contract and adjust the contract amount accordingly. Supplemental agreements, specifically change orders, may also be used to change or waive specifications, even when there is no effect on contract costs.

When signed by the Contractor and the Resident Engineer, supplemental agreements are binding legal documents that supplement the original contract.

Four different types of supplemental agreements may be used to amend ADOT construction contracts:

1. A *letter of agreement* is used if the cost of the extra work is less than $10,000. This is simply a letter sent by the RE to the Contractor describing the change and paying for that change with a lump sum amount. Payment is made under Item 9240101, Miscellaneous Work (Resident Engineer Use Only). Letter of agreements are not to be used to change, add or delete a specification.

2. A *change order* uses existing items and unit prices in the bidding schedule or establishes new items and unit prices to pay for extra work. A supplemental agreement form is sent to the Contractor describing the change and listing the pay items and unit prices affected by the change. Much supporting documentation such as a detailed cost analysis, revised design details, and plan sheets are contained in a change order.

3. A *force account* compensates the Contractor for extra work based on the actual hours worked, equipment and materials used (time and materials). It is the most cumbersome and administratively complex supplemental agreement. It contains all the supporting documents found in a change order, plus additional record keeping requirements once the force account work begins.

4. A *time extension* can grant the Contractor additional days to complete the project. The contractor initiates this based on valid reasons to grant additional contract days. The Resident Engineer reviews and recommends a number of additional days. The District Engineer grants final approval.

The type of supplemental agreement used depends on the cost and complexity of the contract change. Simpler changes can be done by minor alteration, while the more complex changes, for which costs are difficult to quantify, may need to be done by force account. The order of increasing complexity is:

1. letter of agreement, 109.04(A),

2. quantity adjustments by change order using existing pay items, 109.04(B),

3. detailed estimate (cost analysis) by change order, 109.04(C), and finally

4. force account, 109.04(D).

The Letter of Agreement

The letter of agreement is best suited when the changes are simple, can be easily identified and estimated, and cost $10,000 or less. Letter of agreements are the easiest for the Department to administer and do not require an extensive approval process. The letter of agreement can also be used to credit the Department for cost savings that result when the RE relaxes minor specification requirements. The intent shouldn't be to nickel-and-dime the Contractor, but to recover legitimate cost savings when the Contractor is clearly realizing a quantifiable economic benefit as the result of a change.

The Change Order

A more formal documentation and approval process is needed for this type of supplemental agreement. If the change cannot be handled by adjusting the quantities of existing contract items—109.04(B), then a detail cost analysis of the extra work must be performed—109.04(C). The change order is best suited when the work can be quantified ahead of time. Since change order prices are generally agreed on before the extra work begins, Contractors may include many contingencies in their cost estimates to offset any perceived risks.

A zero dollar procedural change order is established when changes, additions or deletions are made to the specifications.

The Force Account

The force account should be the supplemental agreement of last resort because it is the most expensive and administratively tedious. The force account is used for contract changes in which the amount of work is difficult to quantify (such as an emergency situation) or the financial risks of performing the work are too high for the Contractor. The RE estimates ahead of time what he or she believes the extra work will cost and gets the necessary approvals to establish the force account. Once the work begins, daily records are kept of the labor, materials, and equipment used to accomplish the extra work. The Contractor takes these daily records and invoices to the Department for the work, based upon preapproved hourly rates and material costs. The field office reviews and approves these invoices before paying the Contractor.

To sum up, the force account is best used when:

1. defining the work clearly and accurately enough for a change order is too difficult,

2. the extra work needs to begin right away, or

3. the RE and the Contractor cannot agree on costs.

Investigation and Preparation

Subsection 104.02 of this manual describes the different types of contract changes and the process for analyzing any contract change. In 104.02 we said that the Resident Engineer must basically answer these four questions when analyzing a contract change:

1. Was there a contract change? (What was the change?)

2. Who caused the change?

3. What are the impacts of the change?

4. What are the costs?

Subsection 104.02 should be referred to when investigating and analyzing any contract change.

The results of analyzing a contract change are documented in the supplemental agreement. See section on "Documentation" that follows.

Cost Analysis

An RE's cost analysis is required for all supplemental agreements including force accounts and letters of agreements. Cost analyses for extra work are best done by carefully examining the impacts of the change first, then looking at costs last.

Here is a rudimentary procedure that can be used on any cost analysis that will keep you focused on analyzing the impacts first before you are ready to examine costs:

1. Quantify the Extra Work

This means calculating the amount of work that has to be performed: such as cubic yards (cubic meters) of dirt to move, linear feet (meters) of guardrail to install, or pounds (kilograms) of rebar to eliminate. The trick here is not only calculating the quantity correctly, but also selecting the correct unit of measurement. Your selection should be based on industry practice and what unit of measurement best represents how the work will be performed. For example, excavation work is usually done on a cubic yard (cubic meter) basis because excavation work involves moving volumes of material. On the other hand, structural concrete is usually estimated on a square yard (square meter) basis and not by the cubic yard (cubic meter) basis ADOT uses to measure it for payment. Most of the expense in structural concrete is in the formwork and not in the amount of concrete used. Selecting the correct unit of measurement is an important element in producing an accurate analysis.

2. Analyze the Construction of the Work

Construct the work in your mind. Write down all the different steps that have to be followed (continuously ask yourself who will do what, where, when, and how?). This is where you analytical thinking as a technician or engineer is of prime importance. One reason project supervisors' estimates are usually less than the Contractor's on extra work is that Project Supervisors fail to take into account all the little hidden extras that add to the cost of the work (ex., additional crane time may be needed to lift extra rebar from a delivery truck to a bridge deck).

3. Select the Crew Size, Equipment and Materials Needed to Complete the Work

Once you have decided how you're going to build the work and have broken it down into smaller, definable units, then it is simply a matter of selecting the appropriate resources for the work. This selection is based on judgment as well as availability of the needed resources.

4. Estimate Production Rates

Here a lot of judgment is involved and often historical data can be used. Some of the more experienced inspectors may be able to help estimate how long the work will take. Sometimes you

just have to assume a rate. Two things to remember are that no one works a 60-minute hour or less than half a shift.

5. Calculate Direct Costs

Up to this point, we haven't even mentioned costs and yet a lot of analysis has already been done. Good cost estimates are often the result of understanding how to build the work (steps 1 through 4) more than having accurate numbers on costs. On the other hand, don't be afraid to call material suppliers and to use the Contractor's payrolls to improve your accuracy.

Another source of historical cost information is *Means Heavy Construction Cost Data*. This cost guide is published yearly and contains unit cost information as well as information on production rates and crew sizes.

Direct costs usually include project overhead, but not home office overhead. Don't forget incidental costs for things like haul roads, water, and waste disposal.

6. Add Markups and Arrive at a Grand Total or Unit Price

This is the easiest and most straightforward step of all. Sales tax and payroll cost are usually a percentage of the net amount while things like bond, home office overhead, and margin (profit) are a percentage of the gross amount.

This is cost estimating in its most general form. Think of it as a central theme with many variations since the type of work and the needs of the estimator often have a great influence on the way in which the estimate is carried out. Applying these basic steps in order, for even the most complex analysis, will improve your accuracy by keeping you focused on the cost analysis process rather than on the bottom-line result.

Negotiating

Subsection 104.03 and the partnering process should be viewed as a valuable tool to negotiate the contract change amount, if any. If the extra work is not covered by an existing item, the Resident Engineer and the Contractor may be able to negotiate a new unit price for the work and establish a new item or items in the supplemental agreement. If the Contractor proposes a new item or unit price, he or she must provide a detailed cost analysis. The cost analysis should include a breakdown of the estimated time for labor (including labor classifications) and the estimated costs of materials and equipment. The total cost of the extra work is divided by the units of work to arrive at a unit price for the work.

In cases in which it is necessary for the Contractor to submit a cost analysis to support the cost of the change, the Resident Engineer must make a complete review of the Contractor's analysis. The Contractor's analysis should be compared with the RE's analysis. The RE should be completely satisfied that the Contractor's cost analysis is equitable and fair before accepting it as part of the supplemental agreement.

The RE's analysis can be made part of the supplemental agreement instead of the Contractor's if both parties agree.

Some REs think that Contractors try to take advantage of the Department when a change order arises. This is usually not the case. Contractors are no longer in a competitive bid situation after they're awarded the project, so there is no reason for them to assume unnecessary risk. This lack of risk taking is simply reflected in Contractors' change order prices.

Authorization

Authorization Levels

1. Resident Engineers: REs are authorized to approve changes to the contract that do not exceed $50,000. This authorization will include changes in contract specifications, design and unit price adjustments. Contact and consensus with the both the Project Manager and project designer will be required on design changes that are greater than $25,000. Project Managers should also be kept informed of all other significant changes. If the RE cannot reach a consensus with the Project Manager and designer on a change, then the issue should be immediately escalated.

2. District Engineer: The DE will have authority to approve changes to the contract that equal or exceed $50,000 but are less than or equal to $250,000. This authorization will include changes in specifications, design, and unit price adjustments. Concurrence from the Project Manager and the designer will be needed on all design related changes. In the absence of the District Engineer, the Assistant State Engineer for Construction has this authority.

3. Deputy State Engineer: The Deputy State Engineer will have authority to approve all supplemental agreements that exceed $250,000 but are less than $500,000. This authorization will include changes in specifications, design, and unit price adjustments. Concurrence from the Project Manager and designer will be needed on all design related changes.

4. State Engineer: The State Engineer will have the authority to approve all supplemental agreements that exceed $500,000 but do not exceed $1,000,000. This authorization will include changes in specifications, design, and unit price adjustments.

When an individual change exceeds 2% of the contract amount, a Resident Engineer or District Engineer may not approve any supplemental agreement without the approval of the Assistant State Engineer for Construction. The RE is responsible for monitoring the cumulative value of all changes to the original contract amount. The RE must verify the project budget can accommodate all supplemental agreement amounts by referencing the Finance Card found in the Contract Card of your FAST Desktop. If not, a Request for Additional Project Funds exhibit 109.04-5 must be submitted and approved by the Assistant State Engineer for Construction.

Contacts For Supplemental Agreements

The authorization levels discussed previously apply to the financial approval of a supplemental agreement. Changes that require alterations to the specifications, ADOT design policy or design details have to be agreed upon by the appropriate ADOT technical section. A change must receive technical authorization before the cost of the change can be approved. The contact must be documented in the Supplemental Agreement Tracking System (SATS) Contract Revision Notification (CRN) screen.

The ADOT technical managers include Valley Project Management, Statewide Project Management,

Value Analysis, Materials, Roadway, Environmental, Traffic Engineering, Engineering Technical Group, Right of Way and Bridge.

If any technical manager does not agree with the proposed Supplemental Agreement, the agreement must be escalated to the applicable Deputy State Engineer(s) for approval.

The District Engineer has authority to approve supplemental agreements for federal-aid projects in the certification acceptance program. Although FHWA does not need to approve these supplemental agreements, they do need to be advised that the supplemental agreement is being processed. FHWA contacts are required on all federal-aid projects not in the certification acceptance program. Any local government or agency participating on a project must also be contacted.

Time Extensions

The District Engineer has the authority to approve all time extensions, whether they are submitted on the "Contractor's Request for Extension of Contract Time" form or whether the issue of time is addressed in a change order. Letters of agreement are not to be used for time extensions.

Escalation of Supplemental Agreements

Should there be an internal lack of consensus on any proposed supplemental agreement, the DE, RE, Project Manager, and the project management team should make every effort to reach a satisfactory solution. If necessary, the issue may be escalated to the Assistant State Engineer for Construction or the Deputy State Engineer, who will then attempt to resolve the issue to the satisfaction of all concerned.

Documentation

Contract Revision Notification Requirements for Supplemental Agreements (See Exhibit 109.04-1)

The purpose of Contract Revision Notification Documents is to provide documentation that details ADOT approvals and Contractor acceptance of contract changes. No payment can be generated until all required approval dates have been entered into the Contract Revision Notification Approvals SATS screen (and saved). This document shall be prepared and distributed within 48 hours of the Emergency Authorization date. The Emergency Authorization date is the date ADOT and the Contractor agree additional work is required. The Contract Revision Notification is important because it documents that authorized approvals for contract changes have been obtained so that work and payment can proceed before a detailed Supplemental Agreement is signed as the official contract document. In cases where exact costs cannot be determined, the Contractor and the Resident Engineer shall prepare a cost estimate and the Resident Engineer shall document the work as if it were a force account until an exact cost can be agreed upon. However, if the exact cost cannot be determined within 10 calendar days, the Contractor and the Resident Engineer shall document the work as a force account. A force account (supplemental agreement or line item) cannot be converted to a change order after the supplemental agreement has been created in SATS and/or payment has been made. A completed formal detailed Supplemental Agreement with exact cost shall be processed within 45 calendar days following the Emergency Authorization date on the Contract Revision Notification.

The Resident Engineer or his designee shall use the SATS program in the FAST Data Base to prepare the Contract Revision Notification Document. The following contacts will be made.

1. The person authorizing the change (see "Authorization Levels" above).

2. The Assistant State Engineer for Construction and the Project Manager if the Supplemental Agreement cost warrants (see "Authorization Levels" above).

3. If the design was modified, the name of the registrant that was contacted as specified under "Sealing Change Orders" below.

4. The person contacted within the appropriate ADOT technical section if ADOT Standard Specifications, Special Provisions, or Standard Drawings were altered (see "Contacts for Supplemental Agreements" above).

5. Contractor's Agent.

6. Federal Highway Administration and local government contacts.

The original will be filed in the project files, with additional copies distributed to the:

1. Contractor.

2. Field Reports.

3. Local Government and/or FHWA as applicable (FHWA must be contacted for Interstate projects > 1 Million).

4. All other contacts specified in the Contract Revision Notification.

Office Procedure For Contract Revision Notification

1. Start the Contract Revision Notification as soon as you know that a contract change will occur. The document will help you identify whom you should contact. A guide to assist in creating CRN's & SA's can be found on the ADOT website @ http://adotnet/forms/fast/SATSUserGuideRev5.pdf.

2. As soon as you feel the document is complete, advise the RE for a final edit and for his approval.

3. Print a hard copy of the completed document to place in the file.

4. Send the document to your District Engineer and to Field Reports.

5. When the supplemental agreement document is complete attach a hard copy of the Contract Revision Notification document as the cover sheet. If the cost has changed modify the cost on the Contract Revision Notification document before attaching it to the Supplemental Agreement.

Supplemental Agreement Forms

Immediately following distribution of the Contract Revision Notification Documents, the RE or his designee should proceed with the preparation of the formal supplemental agreement. The completed formal supplemental agreement will be submitted **45 calendar days** following the Emergency Approval date on the Contract Revision Notification.

The text of a change order (Exhibit 109.04-2) consists of:

- the Request (a description of the extra work);
- the Reason for the work;
- a Cost Analysis, showing the method of measurement and the cost effects of the work.

Similarly, the text of a force account work request (Exhibit 1-15) consists of:

- the Request (a description of the extra work);
- the Reason for the work;
- the Pay Item Adjustment, showing the cost breakdown of the estimated labor, materials, and equipment required to perform the extra work.

The RE should also consider using drawings, photographs, and quotations from the specifications or developing unique provisions to make supplemental agreements clearer and more authoritative.

An explanation of rate establishment may also be required on a force account work request if the hourly rate for a particular type of equipment is not covered in the Rental Rate Blue Book for Construction Equipment.

A supplemental agreement is usually signed first by the RE, then sent to the Contractor for signature. Once returned from the Contractor, the supplemental agreement is sent to the District office for approval and / or signature. The supplemental agreement and all attachments are then forwarded to Field Reports for processing.

Letter of Agreements

Letter of agreements will be cosigned by the Contractor. The Contractor's representative must be included on the authorized signature form.

Each letter agreement of authorization will include the following information (see Exhibit 109.04-3):

- The TRACS number, project number and date of authorization;
- Reason for the work authorized;
- The cost of the alteration.

When it's necessary for the Contractor to submit an analysis to support the cost of the change, the Resident Engineer must make a complete review of the Contractor's analysis and be completely satisfied that it is equitable before accepting it and making it a part of the supplemental agreement.

The Resident Engineer's review will be in the form of a completely independent cost analysis, which will be attached to the letter agreement and retained in the project office.

Arizona Department of Transportation
Intermodal Transportation Division
Contract Revision Notification

10/08/03

To: R.U.Sure
District Engineer Signature_____

From: I.M. Right
Resident Engineer Signature_____

Tracs#	Project#	Project Name
H1234501C	I-10-4(001)	I-10-TI, ANYWHERE

Contractor	Contract Amt	Contingency %	Contingency Adjustment %	Contingency Amt
Quality Construction Co.	$11,555,000.00	5 %	%	

Original Amt	Percentage of Contract	Accumulated Amt	Accumulated % of Contract
$85,000	.74 %	$278,000.00	2.41 %

Agreement Type	Document Num	SATS Doc Num	Emergency Approval Date
Change Order		1004	10/06/2003

Prime Designer Errorless Design Engineering

Reason Code Plans, Revisions, and Oversights

Brief Description

Add a 6" dedicated waterline to the pump station for the fire suppression system.

SA Description

During the construction of the pump station it was determined that the new 4" water line would not supply enough flow to run the fire suppression system. The pressure and flow problems were not determined until after the majority of the 4" line had already been installed. The designer recommended installing an unmetered, dedicated 6" ductile iron line for the fire suppression system.

Name	Title	Date Contacted	Comments
R. U. Sure	District Engineer	10/06/2003	Concurs
M. I. Sane	ADOT Valley PM	10/06/2003	Acknowledged Change
C. Y. Bass	Errorless Design Engineering	10/06/2003	Recommended Change
Y. Knott	Quality Construction Co.	10/06/2003	Contractor's Authorizing Agent
B. Ware	FHWA	10/06/2003	Authorized FHWA participation

Exhibit 109.04-1. Contract Revision Notification

Arizona Department of Transportation
Intermodal Transportation Division
Supplemental Agreement

12/01/03

Change Order No. 1004

Tracs No.: H1234S01C **Project No.:** I-10-4(001) **Org:** 7777 Phoenix

Project Name: I-10 TI, Anywhere **Contractor:** Quality Construction Co.

☒ Federal Aid

☐ Non-Federal Aid

Request:
To create;
Bid Item No. 8073999 - 6" Tapping sleeve
Bid Item No. 8080039 - 6" Backflow Preventor
Bid Item No. 8082106 - Pipe, Ductile Iron, 6"
Bid Item No. 8089399 - Misc. (Concrete Coring)
Bid Item No. 8089999 - Misc. (City Permit)

Reason:

During the construction of the pump station it was determined that the new 4" water line would not supply enough flow to run the fire suppression system. The pressure and flow problems were not determined until after the majority of the 4" line had already been installed. The designer recommended installing an unmetered, dedicated 6" ductile iron line for the fire suppression system.

Pay Item Adjustments:

Sec	Item Nbr	Description	Unit	Unit Price	Quantity	Amount
1	8073999	6" Tapping Sleeve	EACH	2,000.00	1.000	2,000.00
1	8080039	BACKFLOW PREVENTION ASSEMBLY, 6"	EACH	6,000.00	1.000	6,000.00
1	8082106	PIPE, DUCTILE IRON, 6"	L.FT.	50	1250.000	62,500.00
1	8089399	MISC (Concrete Coring)	EACH	1,500.00	1.000	1,500.00
1	8089999	MISC (City Permit)	L.SUM	13,000.00	1.000	13,000.00

Total **$85,000.00**

	Plus	**Minus**
Total Difference	$85,000.00	$.00

Date: _____ Date: _____ Date: _____ Date: _____

_____ _____ _____ _____
Resident Engineer City/County Engineer District Engineer Field Reports

For valuable consideration, it is mutually agreed that the matter detailed above shall be done and payment made as shown herein for a Supplemental Agreement Change Order, all in accordance with the terms of the contract. For work being performed as a Supplemental Agreement Force Account Work Order, final payment shall be made as stipulated in the Standard Specifications and its supplements upon completion of said work.

Date: _____ **Date:** _____ **Date:** _____

Approved for: _ **Approved for State of Arizona** **___Approved without Federal participation**
Contractor **___ Approved with Federal participation**

By:_____ By:_____ By:_____

Exhibit 109.04-2. Change Order Agreement

Arizona Department of Transportation

Intermodal Transportation Division

Supplemental Agreement

12/17/2003

Force Account No. 1

Tracs No.: H541701C **Project No.:** AC* 202-C(006)B **Org:** 7742 Phoenix

Project Name: SANTAN, I-10/MARICOPA ROAD TI **Contractor:** PULICE CONSTRUCTION INC.

☒ Federal Aid

☐ Non-Federal Aid

Request:

To compensate the Contractor for extra work necessary to remove and replace unsuitable material.

Reason:

After milling off the existing AC from WB I-10 the Contractor started preparation of the subgrade for placement of the 50% AB - 50 millings mix. The large hauling vehicles started to break down the existing subgrade causing it to pump badly. The subsurface is randomly saturated in both small and large areas and is at optimum moisture. After an inspection by ADOT's Geotech Engineer it was determined that existing material would have to be removed up to 2' in depth and replaced with suitable material.

Section:			
1	**Labor:**	20,000.00	
	Equipment:	40,000.00	
	Materials:	15,000.00	**Original Request Amount**
	Fa Amount	$75,000.00	75,000.00
		Plus	**Minus**
	Total Difference	$75,000.00	$.00

Date: _____ Date: _____ Date: _____ Date: _____

_____ _____ _____ _____

Resident Engineer City/County Engineer District Engineer Field Reports

For valuable consideration, it is mutually agreed that the matter detailed above shall be done and payment made as shown herein for a Supplemental Agreement Change Order, all in accordance with the terms of the contract. For work being performed as a Supplemental Agreement Force Account Work Order, final payment shall be made as stipulated in the Standard Specifications and its supplements upon completion of said work.

Date: _____ Date: _____ Date: _____

Approved for: _ Approved for State of Arizona ___Approved without Federal participation
Contractor ___ Approved with Federal participation

By:_____ By:_____ By:_____

Exhibit 109.04-3. Force Account Agreement

Arizona Department of Transportation

Intermodal Transportation Division

Supplemental Agreement

12/18/2003

Letter of Agreement No. 2

Tracs No.: H508801 **Project No.:** AC* 600-7-(1) **Org:** 7742 Phoenix

Project name: I-10 TI, PH 2(INCL CHNDLR BLV) **Contractor:** EDWARD KRAEMER & SONS, INC.

☒ Federal Aid

☐ Non-Federal Aid

Request:

To compensate the Contractor for removal of reinforced concrete curb from the top ends of Equipment Overpass.

Reason:

This work is necessary to accommodate the roadway section and is not identified in the plans as a removal item. This curb required the use of jackhammers and compressors for removal. Reference subitem 56.

Pay Item Adjustments:

Sec	Item Nbr	Description	Unit	Unit Price	Quantity	Amount
1	9240101	MISCELLANEOUS WORK (RESIDENT)	L.SUM	1.00	0.000	$.00
		Subitem: LOA56 Unit Price Adjustment:	.00	1.00	761.580	$761.58
				Total:		$761.58

	Plus	Minus
Total Difference:	$761.58	$.00

Approved for ADOT

Robert J. Samour Date

Approved for Edward Kraemer & SONS, INC.

Contractor Signature Date

cc: Field Reports

Exhibit 109.04-4. Letter Agreement

ARIZONA DEPARTMENT OF TRANSPORTATION

OFFICE MEMO

May 8, 2003

TO: JULIO ALVARADO
Assistant State Engineer
Construction Group 172A

FROM:
Resident Engineer
Org Name

RE: TRACS #, PROJECT #
PROJECT NAME
Project Location

ORG:

The referenced project requires additional work in order to adequately address the construction needs at this location. Pertinent fiscal information is as follows:

Original contract amount:	$	1,637,003.74
Five percent contingency:		34,335.55
15% CE		103,006.65
DPS		21,000.00
Incentives		120,000.00
Original Available:	**$**	**1,915,345.94** (Agreement Estimate Recap/Finance Card)
Actual Construction Costs	$	1,626,342.58
Actual CE		142,389.74
Contract Work Remaining		165,000.00
Additional Suplemental Agreements		98,000.00
Additional CE Costs		45,000.00
Proposed New Total Needed:	**$**	**2,076,732.32**
Less Previous Increases	**$**	**(25,000.00)**
Requested Amount:	**$**	**136,386.38**

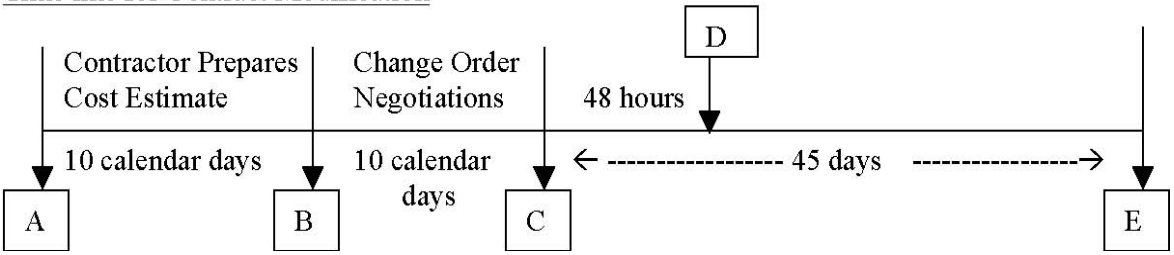
Reason for increase: (Be specific)

RESIDENT ENGINEER

DISTRICT ENGINEER

Exhibit 109.04-5. Request for Additional Funds

Time line for Contract Modification



A. Contractor or ADOT agree to additional work that is not included in the contract.

1. Contractor is asked to prepare a detailed cost estimate or unit prices for the work, and ADOT specifies a reasonable time for the Contractor to complete the estimate. Std Spec 109.04C specifies 10 calendar days for the Contractor to prepare a cost estimate.
2. If work is required to start prior to "C", ADOT starts documenting the work as if it were force account.

B. Cost Estimate is received from the Contractor.

1. Start change order negotiations [see 109.04(D)].
2. If the cost estimate is not received from the Contractor on time or if a contract price adjustment cannot be agreed upon, the work is processed as a force account and the Resident Engineer will prepare the force account request.

C. Emergency Authorization Date
ADOT and Contractor agree to proceed as either a change order or force account.
If Force Account then ADOT estimate is required.

D. Contract Revision Notification Document prepared for a force account or a change order.

E. Change order is completed and signed as the official contract document.

Sealing Change Orders

Resident Engineers are responsible for sealing change orders only when they have been in responsible supervisory charge of a design issue. Design issues include changes to or the creation of drawings or technical specifications covering the quality or performance of the finished construction work. For example, seals are not required for contract administrative issues such as quantity, cost, and time adjustments.

When the change is to an existing design sealed by registrant, the RE shall coordinate with the registrant. When consulting designers develop changes, they shall send sealed drawings or specifications to the RE for inclusion with the change order. When a value engineering proposal requiring new drawings is submitted, it shall be sealed by the Contractor's registered engineer prior to final approval of the proposal. When an issue has been escalated beyond the Resident Engineer, it shall be sealed by the responsible registrant making the final decision. Drawings and specification must be sealed in accordance with Article R4-30-304(A)(3) of the Code & Rules of the Arizona State Board of Technical Registration.

All change order forms must originate from and be tracked by the RE in the same manner as all other change orders. Any new or revised sealed drawings or specifications shall be attached to the supplemental agreement forms or referenced on the first page of the form.

Force Account Work

Procedures

On a force account the Department has a right to direct the work. In other words, Inspectors, Project Supervisors, and the Resident Engineer can control how the work is performed and what labor, materials and equipment the Contractor uses. They can also decide what to include and exclude on a force account. The Contractor's foreman or forewoman should still retain day-to-day supervisory control over the labor and equipment to ensure their efficient and economical use.

Inspectors must track daily the Contractor's labor and equipment hours as well as the materials used for force account work. The force account daily report form is used to track force account work. A copy of the form is shown in the Force Account Instructions booklet referenced at the end of the chapter.

A copy of the force account daily report is given to the Contractor, who then invoices the Department for the labor, materials, and equipment shown on the daily reports. The field office reviews and approves these invoices per specifications and then pays the Contractor. If charges appear on the detail and are not accompanied by the proper documents, the charges should be removed from the detail before payment is made. Partial payments on force accounts are not allowed. Copies of all approved invoices/details should be sent to Field Reports within five days after payment is made.

Force Account Markups

Hourly payroll labor rates (including the hourly fringe benefit amount) are multiplied by 1.5 to arrive at a gross regular pay rate for labor used on a force account. This 50 percent markup on labor is intended to cover the Contractor's expenses for:

1. payroll taxes,
2. FICA,
3. social security,
4. Medicare,
5. workers compensation,
6. liability insurance, and
7. project overhead and profit (including the administrative overhead for the force account).

No additional markups are allowed for the Contractor's labor costs, even if the Contractor can prove that actual costs for the expenses listed above are greater than the 50 percent markup.

Subsistence and travel allowances paid to the worker are not allowed this 50 percent markup.

Subcontractor work and the costs of materials supplied to a force account are also marked up to offset the Contractor's administrative and handling costs. See Subsections 109.04(D)(2) & (D)(7).

Outside rented equipment is eligible for reimbursement at the invoiced rate plus a 10 percent markup, plus

the hourly operating cost (HOC). [(Rental Invoice X 1.10) + HOC]

Owner-Operated Equipment and Specialized Work

Equipment can be treated as owner-operated only when the person who owns the equipment is the one operating it. For example, if the Contractor hires Joe's Drilling to drill holes for guardrail posts, then Joe has to be the one who operates the drilling equipment, not Joe's cousin or one of Joe's employees. Otherwise, Joe's Drilling is treated as a lower-tier Subcontractor and paid Blue Book rates for equipment and payroll rates, plus fringes and markup for the operator.

To avoid the added administrative expense that occurs when specialized Subcontractors perform force account work, the Resident Engineer is authorized to pay for specialized work by invoice when the value of the work is $5,000 or less. Contractors are allowed a markup on this invoiced work in accordance with 109.04(D)(7). The specialized work is lumped into all the other subcontract work when determining the markup percentage.

On federal-aid projects, the Contractor still needs to submit certified payrolls for force account work performed by specialty Subcontractors, even when work is invoiced.

Administering Force Accounts

Refer to the ADOT Force Account Instructions booklet for further information on documenting and processing force account work.

Field Reports keeps current copies of the Blue Book as well as past copies for the last five years. Field Reports will actively assist you in determining equipment rates when the need arises.

109.05 Eliminated Items

Both 109.05 and 102.06 allow the Department to eliminate contract items. If items are eliminated or not used by the Department, the Contractor may request an equitable adjustment in the contract amount in accordance with Subsection 108.11.

It is very important for the Resident Engineer to notify the Contractor in writing as soon as possible about an eliminated item. This ensures the Contractor will stop any further work on the item. It is important for the Contractor to immediately notify any Subcontractors or materials suppliers affected by the elimination so they can stop any related work.

Under 108.11, the Department allows the Contractor, Subcontractors, and affected Material Suppliers to recover any direct expenses related to an eliminated item up to the notification date. Such expenses may include:

- materials already fabricated that cannot be returned or used elsewhere (i.e., custom cut and bent rebar);
- re-stocking fees for materials already delivered to the Contractor;
- labor time used in producing shop drawings, cut sheets, and other preparation costs directly related to the eliminated item;
- charges for delivering or picking up materials;
- plant setup or mobilization efforts for the eliminated item; and
- reasonable profit and direct overhead for expenses incurred to date.

Lost profit, lost home office overhead, and any other money lost due to the eliminated item cannot be recovered. Even if the Contractor claims the eliminated item contains a disproportionate amount of overhead, profit, or uncut subcontract work, the item should be eliminated at its contract unit price (see Subsection 109.03). Only actual expenses directly related to the eliminated work should be added back into the contract.

109.06 Partial Payments and Retention

Monthly Progress Payments

Payment Procedures

Construction progress estimates are prepared monthly, compensating the Contractor for work performed and materials furnished each month. The monthly cutoff date is 10 business days (excluding state holidays) prior to the third Wednesday of the month. The progress estimates are due at Field Reports Section five working days after the cutoff date. The MONTHLY ESTIMATE and CONTRACTOR PAY dates are shown on the ADOT calendar.

Contractors are paid on the third Wednesday of the month. Contractors who post securities instead of retention must have their escrow account deposits completed by the Friday prior to payday.

The Department does have the right to withhold part or all of the monthly progress payments if the project work or project progress is unsatisfactory. If the Resident Engineer is suspicious of the Contractor's ability to complete the project, a meeting with the Contractor and the District Engineer should be held to discuss the issue before any payments are withheld (also refer to Subsection 108.04 of this manual on project delays).

Work performed under a supplemental agreement should not be paid for until a fully approved copy of the agreement has been received from Field Reports Section. Payment may be made if emergency approval has been obtained in accordance with Subsection 109.04 of this manual. On federal aid projects, the FHWA must give tentative approval before payment can be made. If a supplemental agreement is considered "not eligible" for federal assistance, then the items included in the agreement must be shown in the non-FA portion of the monthly estimate.

Prescribed penalties for work items failing to meet specification requirements (i.e., PCCP smoothness or compaction on end-product AC) do not require a supplemental agreement. The Resident Engineer creates a separate pay item and notifies the Contractor by letter of the penalty adjustments. A copy must be forwarded to Field Reports before the deduction is made. The same procedure applies to contract bonuses.

Lump sum items in the original contract may be paid for on the monthly estimates if the amount of work, in the opinion of the Resident Engineer, is of sufficient magnitude to warrant partial payment. For lump sum structures, the Contractor should submit an estimate of the quantities desired for partial payment at least two days prior to the cut-off date (see Subsection 109.10).

For months when the progress payment is zero or a negative amount, do not transmit an estimate to Field Reports. Instead, notify them in writing that no estimate will be transmitted that month for the project.

Documenting Payment

Quantities developed for the monthly progress estimate should be based on sound engineering procedures rather than on arbitrary selection of quantities that help expedite payment. See Subsection 109.01 of this manual and the Pay Item Documentation for Inspectors cited in the references at the end of this chapter for further information on documenting pay quantities.

The monthly pay estimates are prepared on a computer program titled, *Construction Progress Estimate*. Pay item quantities taken from the Inspectors' diaries are entered into the program, which prepares a pay estimate for the Department.

As the pay estimate is prepared, the importance of entering only quantities documented in a daily diary cannot be overemphasized. Pay quantity entries and other entries should not just appear on the progress estimate. Sufficient backup documentation (i.e., diaries, supplemental agreements, invoices, and others) needs to support each entry.

If corrections need to be made for previously paid quantities that are incorrect, the corrections need to be documented (typically in a diary). All payment documentation must be kept as part of the project records and may be subject to periodic audit.

When preparing the monthly progress estimate, the Resident Engineer and the Contractor's superintendent should review all quantities of work completed before submitting the estimate to Field Reports. Should there be pay item quantities on which the two parties disagree, the disagreement needs to be resolved (through escalation if needed) prior to submittal of the next month's estimate. A supplemental monthly payment estimate may be submitted if resolution occurs early within the next monthly payment period and considerable payment is involved (over $500). Subcontractors and Material Suppliers should be supplied with copies of the monthly progress estimate upon request.

ADOT has the largest ongoing construction program in the state. Our construction projects employ thousands of people and hundreds of small businesses, both on and off the project site. Our construction progress estimates pay out millions of dollars into the state's economy, and during periods of economic slowdown, we are the mainstay of the state's construction industry. ADOT Field Offices have a duty to contribute to this positive economic impact by producing timely and accurate pay estimates.

Supplemental Estimates

The Field Office may prepare a supplemental estimate at any time of the month if a large payment was omitted from the previous monthly estimate. The ID number used for a supplemental estimate should be the same as the previous monthly estimate, followed by a suffix such as "S" for "supplemental" or "A" for the first supplemental estimate of the month.

Retention Release

When progress payments are made to the Contractor, 5 percent of the payment amount is retained by the Department until acceptance of the project. This retention is used to cover any contingencies that may arise before the project is accepted and final payment is made. Such contingencies may include:

- overpayment for pay items,
- liquidated damages,
- unsatisfactory work, or

- anything else that might place the Department at financial risk.

As a project nears completion, Contractors will ask to have part of their retention released to them so the money can be freed up to bid and bond other work, and to finalize payments to Subcontractors. Retention shall be released as follows in accordance with Subsection 109.06(B) of the Standard Specifications.

1. Initial Reduction:

   After seventy-five percent of the work has been complete, the Department will pay the Contractor sixty percent of the amount currently held in retention, thereby reducing accumulated retention to two percent of the value of the work complete. The Department will then retain two percent of each subsequent monthly estimate until final acceptance, as specified in Subsection 105.20(B), provided the Department determines that the remaining amount held in retention is adequate to cover liquidated damages and disputed work, and to fulfill documentary requirements of the contract.

2. Reduction at Final Acceptance

   After final acceptance, as specified in Subsection 105.20(B), and upon written request of the Contractor; the Department will pay the Contractor fifty percent of the amount currently held in retention, thereby reducing accumulated retention to one percent of the value of the work completed. If requested in writing by the Contractor, the Department may also reduce the amount held in retention to less than one percent, provided the Engineer determines that such further reduction is appropriate. Such reductions will only be considered if the Department determines that the amount retained will be sufficient to cover any payroll deficiencies, incomplete documentation, and liquidated damages.

3. Conditions:

   No release of retention will be made unless approved in writing by the sureties for both the performance bond and the payment bond. Any money retained in accordance with Subsection 109.06(C) for delinquent payroll submittals will be in addition to the amount retained as specified above, and will not be subject to reduction.

Exhibits 109.06-1a and 109.06-1b are examples of the information and conditions needed to initiate a retention release. (See Blank Forms at the end of the chapter.)

109.07 Partial Payment for Material on Hand

Subsection 109.07 provides a list of contract items that are eligible for a partial payment when the materials needed to construct those items are stockpiled by the Contractor or a materials supplier. The partial payment factor is applied to the unit price of the item.

To qualify for a partial payment on stockpiled materials, the following conditions must be met.

1. The Resident Engineer must be satisfied with the progress of the project.
2. When applicable, the stockpiled material should have been tested and the material must have passed the test(s).
3. When applicable, acceptable certificates of compliance for the material have been received by the Department.

4. The material is stockpiled on the project, or if stockpiled off the project (including a commercial material sources), the material is located in a separate area away from the main inventory.

The purpose of this partial payment is to promptly compensate the Material Suppliers for materials produced for the project. The intent is not to finance their inventory. Once a partial payment is made, the Material Supplier should not be allowed to sell the material to other customers.

Resident Engineers have the authority to deny partial payment for material stockpiled at commercial sources if the material cannot reasonably be separated from the main inventory, or if the Resident Engineer suspects the Material Supplier is in financial trouble. In either case, the material should be delivered to the project site or the Contractor's yard before a partial payment is made.

When material is being produced or stockpiled on private property, the Contractor must submit a letter to the Resident Engineer from the private property owner granting permission to produce or stockpile the material (refer to Subsection 107.11 of this manual).

Partial payments for materials not listed in the table can be made without the need for a supplemental agreement. The previous conditions for partial payment eligibility must be met, and both the Resident Engineer and Contractor must agree on a partial payment factor. Partial payment for lump sum items or items measured individually (each) are to be based on Material Supplier's invoices or actual cost records.

ARIZONA DEPARTMENT OF TRANSPORTATION
RETENTION RELEASE REQUEST

May 9, 2003

TO: Manager Field Reports Section

FROM: John Doe
Resident
Engineer

RE: Project AZ-10-3(789), TRACS H598501C
Phoenix-Casa Grande Hwy.

RELEASE OF RETENTION REQUEST

In accordance with paragraph three of Section 109.06 of the Standard Specifications, a request for release of retained funds is submitted for the above referenced project. Please find the following information enclosed:

Yes	No	N/A		
X			A)	Contractor's letter of request.
X			B)	Consent from the Contractor's Surety.
X			C)	Status of Liquidated Damages and/or Time Extensions.

The following items have been reviewed and are correct, current and in compliance with the contract specifications:

Yes	No	N/A		
X			D)	Payrolls (Prime & Subcontractor(s)).
X			E)	Supplemental Agreements.
X			F)	Material Certifications.
X			G)	Trainee Hours.
		X	H)	Pit Royalties paid.
X			I)	Other obligations (Property Owners).
X			J)	Maintenance and Protection of Traffic summaries.

The attached list explains the above information and a list of items that remain to be completed.

Retention funds in the amount of $ 40,000 should continue to be withheld in excess of contract special provisions specifications.

John Doe
Resident Engineer

cc: file
Contractor

Exhibit 109.06-1a. Release of Retention Request

RETENTION RELEASE REQUEST
TRACS NO.: H598501C
PROJECT NO.: AZ-10-3(789)
LOCATION: Phoenix-Casa Grande Hwy.
TERMINI: (M.P. 123)

ATTACHMENT NO. 1

A. Contractor's letter of request dated May 9, 2003 is attached.

B. Consent of Surety is attached.

C. Contractor is currently at 55% time used. I do not anticipate liquidated damages.

D. Certified payrolls for Contractor have been submitted to Field Reports through 4/19/03. Certified payrolls for all Subcontractors have been checked and forwarded to Field Reports for weeks ending between 4/5/03 through 4/19/03. We have additional payrolls here in the office that need to be checked.

E. All Supplemental Agreements have been processed and completed, except for upcoming Change Order No. 18 which will be approximately negative $1.5 million.

F. Material Certifications are OK.

G. Trainee hours to date have exceeded project requirements.

H. No royalties required.

I. All obligations have been met.

J. Maintenance and Protection of Traffic is up-to-date and paid in full.

Exhibit 109.06-1b. Release Of Retention Request

109.09 Acceptance and Final Payment

Once a final acceptance letter has been written for the project (see Subsection 105.20 of this manual), the Field Office can begin to close out the project.

Closing out a project involves verifying that all paperwork is complete for the project and preparing the final estimate.

Final Documentation

The Field Office will prepare the final estimate after the following documents have been submitted and the final actions have been completed:

1. Final acceptance letter has been sent to the Contractor (105.20).

2. All supplemental agreements (change orders, force accounts, minor alterations, and time extension requests) have been signed and executed copies are in the project files (109.04).

3. Verify SATS report to supplemental agreement documentation.

4. All force account invoices have been received and paid (109.04).

5. Field office, Contractor and the Subcontractor agree on final quantities.

6. Incentive and disincentive payments have been substantiated with detailed calculations, drawings, daily diary reports, or other supporting documents.

7. All weekly time charges have been approved by the Resident Engineer and reviewed by the Contractor (108.04 and 108.08).

8. Record drawings (as-built plans) have been reviewed and accepted by the Resident Engineer. Memo has been received from Statewide Project Management indicating the date they received their set of As-Built Plans.

9. Materials checklist has been reviewed by the Resident Engineer and submitted to the Regional Materials Engineer for approval.

10. Memo has been sent to Field Reports informing them of the assessment of liquidated damages, when applicable (108.09).

11. Verification and submission to Field Reports of all certified payrolls for federal aid projects.

12. Verify that all subcontracts have been sent to Field Reports.

13. FHWA-47M (Statement of Materials and Labor) received from the Contractor (federal aid projects only, totaling $1,000,000 or more, for projects located on the National Highway System, regardless of the FHWA role in oversight).

14. Final EEO compliance reports for the last working month and year are on file at ADOT's Civil Rights Office (Forms 10-9405 and PR-1391, federal aid projects only).

15. Certification of Payments to DBE Firms Affidavit are on file at ADOT's Civil Rights Office, for federal aid projects only (Form 320-2301-1/88).

16. Contractor's weekly training reports have been sent to ADOT's Civil Rights Office.

17. Final trainee report completed by Contractor and on file at ADOT's Civil Rights Office for federal aid projects only.

18. For specific pay items, the completion of:

    - asphaltic concrete related documentation (416-9),
    - bituminous treatments documentation (404-5), and
    - bituminous material price adjustment documentation (404-5, 1005-3.01).
    - incentives/disincentive payments.
    - diesel fuel price adjustments.

19. ADOT furnished material, included in a bid item, have been approved by the State Engineer and accompanied by supplemental agreements

20. Roadside Development notice of intent submitted.

21. Roadside Development notice of termination submitted.

Semi-Final Estimate

As the Field Office closes out a project and finalizes the documentation, additional payments may need to be made to the Contractor as quantities are checked and documents received. For an estimate to be considered final, it must entail no more than $500 in payments to the Contractor. Any estimate that is submitted after project acceptance that exceeds $500 is called a "semi-final estimate."

Prior to transmitting a semifinal, notify Field Reports. Semi-finals should be generated with an SF after the estimate number. The Field Office may submit as many semi-final estimates as needed to pay for remaining quantities.

Final Estimate and Support Documentation

The final estimate shows the total as-built quantities of all contract items. All quantities shall be reviewed and approved by the Resident Engineer on a transaction detail log before submitting the final estimate.

A final balance report accompanies the final estimate. This report compares the as-built quantities with the original bid quantities. Any over-run or under-run of 25 percent or more, that is not accounted for by a supplemental agreement, must be explained by the Resident Engineer on the final balance report.

The final estimate is not transmitted electronically. The Resident Engineer signs it, certifying that the quantities reported are final and correct. Deliver the final estimate to Field Reports. For guidance, see the Final Estimate Checklist (Exhibit 109.09-1). To expedite final processing and payment to the Contractor, final estimates must be delivered to Field Reports no later than 45 days after the date of acceptance of the project. If delays are anticipated, the Resident Engineer must notify Field Reports explaining the reason for the delay and providing an expected delivery date. Quantity calculations and other project records

(payrolls, certifications, force account details, etc.) should be kept up-to-date throughout the life of the project so the final estimate can be submitted promptly.

FINAL ESTIMATE CHECKLIST

Documentation to be sent to Field Reports, including:

( ) 1. Final Estimate (Original only, with Resident Engineer's signature. Semi-final required if balance due exceeds $500.00).

( ) 2. Final Balance Report (Original only, with Resident Engineer's signature). Shall match the estimate amount.

( ) 3. Include all sections of the transaction detail log signed by the Resident Engineer.

( ) 4. Submit supporting documentation for all bituminous materials/price adjustments paid by the ton including:
- lab reports and/or invoices
- bituminous materials price adjustment recap

(See Construction Manual Exhibit 4-5, Bituminous Material Price Adjustment Example).

( ) 5. Submit supporting documentation for all Mineral admixture in accordance with Construction Manual Method of Measurement and Basis of Payment. (See Construction Manual Exhibit 4-12, Daily Mineral Admixture Report Example and Blank Forms at the end of Chapter IV).

( ) 6. Supporting documentation for all incentives and disincentives paid.

( ) 7. Start and Completion Memo signed by Resident Engineer.

( ) 8. Acceptance Letter signed by District Engineer.

( ) 9. Time Reports, first and last, for each phase signed by the Resident Engineer.

( ) 10. Request for extension of time, liquidated damage letter and stop/resume work orders.

( ) 11. Form FHWA-47M (Statement of Materials and Labor), when applicable.

( ) 12. Diesel Fuel Recap sheet.

REMINDER OF OTHER SUBMITTALS

MAIL MATERIALS CHECKLIST DIRECTLY TO MATERIALS – 068R (see contract card for verification).

SUBMIT NOTICE OF TERMINATION OF INTENT TO DISCHARGE TO ROADSIDE DEVELOPMENT. (NOI/NOT-Notice of Intent/Notice of Termination).

SEND AS-BUILT PLANS TO PROJECT MANAGEMENT, ENGINEERING BUILDING,
ROOM 295E, MAIL DROP 614E (see CCS-finance).

SEND DBE AFFADAVITS AND TRAINING REPORTS TO CIVIL RIGHTS OFFICE.

WHEN FINAL ESTIMATE IS SUBMITTED TO FIELD REPORTS FOR FEDERAL PROJECTS, ALL FINAL PAYROLLS SHOULD HAVE BEEN RECEIVED BY FIELD REPORTS.

Exhibit 109.09-1. Final Estimate Checklist

109.10 Lump Sum Payment for Structures

(A) General

Measuring quantities for a large structure can become a very tedious and time-consuming undertaking. The intent of paying for structures on a lump sum basis is to minimize measurement and record keeping requirements. When significant quantity variations (± 5% or more) do occur in structural concrete, structural steel, rebar, structural excavation, and structure backfill, the Department does allow measurement for payment. However, the burden of proof is on the Contractor, who must substantiate the variation.

In allowing compensation for significant quantity variations, the Department is purposely trying to discourage contingencies in Contractors' bids. This protects the Contractor from unexpected quantity variations because the Department is willing to take that risk.

(B) Adjustments Due To Quantity Variations

The Inspector should be aware that there are differences between the documented quantities of steel and concrete versus the actual quantities used. These differences are caused by:

- the yield effect of batched concrete;
- imperfections and deflections of formwork;
- concrete spillage and waste;
- rebar and steel that may be shown on cut sheets but are not needed in the structure or used as placement aids; and
- approximations made by the Designers in calculating quantities.

With this in mind, it is a good idea for the Inspectors to track the amount of concrete and steel that go into a structure not only for partial payment purposes, but in case significant quantity variations do occur. Inspectors should collect copies of all steel cut sheets and concrete tickets for future reference.

The Contractor may use cut sheets and concrete tickets to substantiate quantity variations. When this occurs, the Resident Engineer should involve the Designer of the structure, who should verify the original quantity calculations and make any adjustment due to as-built conditions. If the Designers cannot find more than a 5 percent variation, then it is up to the Contractor to produce detailed calculations showing the variations. Cut sheets and concrete tickets cannot be used alone in determining quantity variations. Instead, the Contractor should use as-built dimensions and the plan sheets to calculate any quantity changes.

The Department's review of the Contractor's calculations should be to ensure that sound engineering and mathematical procedures are used. The intent is not to do the calculations for the Contractor, but to verify the accuracy of the calculations.

Variations in structural excavation and structure backfill quantities should be limited to changes in pay limits shown in Standard Details B-19.30, .40 and .50. A change in pay limits would occur only if the original ground line is different than the one used by the Designers, or if the Designers had made some type of calculation error or incorrect assumption when computing the pay quantities. Differences due to the Contractor exceeding the pay limits for constructability reasons (i.e., sloping the excavation) do not qualify for quantity adjustments.

(C) Adjustments Due to Revisions Ordered By The Engineer

When Designers make changes to a structure, any bid item affected by the change is treated as a major item. As a result, the item should be increased or decreased up to 25 percent before an adjustment in the unit price is required, see Subsection 104.02(D)(4)(b). However, since the structure is paid for on a lump sum basis, a change order will be needed to adjust both the quantity of the affected item(s) and the lump sum structure price. Typically, any quantity adjustments are shown as a separate line item on a change order. The original lump sum structure item is deleted, and a new lump sum structure item is added.

(D) Payment

Partial payments for lump sum structures are usually made by collecting delivery tickets for materials incorporated into the structure. This includes concrete tickets, steel cut-sheets, weigh tickets for structure backfill, and invoices for girders and bearing devices. As mentioned in Subsection 109.10(B) of this manual, delivery tickets do not represent the actual amount of material used in a structure. However, for partial payment purposes, delivery tickets and invoices are a close approximation. The Contractor is required to turn in a list of quantities for each structure before the monthly cutoff date. The Inspector or Project Supervisor should review this list with the structures foreperson and get an agreement on quantities before the Field Office processes the monthly pay estimate.

Final payment for a lump sum structure is based on the lump sum amount. The total of the extended amounts for all the quantities must equal the lump sum amount. The total cannot be higher or lower, regardless of their summation. If the Resident Engineer or the Contractor believes there is an error in the bid quantities, then adjustments are handled under Subsection 109.10(B) or (C).